

# **U.S. Department of Agriculture Report to the Invasive Species Advisory Council for their winter 2011 meeting**

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## **A. USDA Progress on ISAC recommendations from the October 2003 meeting**

- 1. ISAC recommendation: Increase efforts in economic analysis to make the case for investments in invasive species efforts. ERS and NIFA please revise.**

The Economic Research Service (ERS) is continuing the “Program of Research on the Economics of Invasive Species Management” (PREISM) initiated in FY 2003. PREISM supports economic research and the development of decision support tools that have direct implications for USDA policies and programs for protection from, control/management of, regulation concerning, or trade policy relating to invasive species. Program priorities are selected through extensive consultation with APHIS, OBPA and other agencies with responsibility for program management.

For example, ERS developed a pest-ranking decision tool for APHIS to determine which pests would be on its 2004 and 2005 Federal-State Cooperative Agricultural Pest Survey (CAPS) list, making transparent the basis for selecting the pests for which State cooperators could receive targeted pest surveillance and detections funds. Also, the rapid spread of soybean rust in South America prompted ERS, in April 2004, to publish a study of the economic and policy impacts of its windborne entry into the United States. USDA used the ERS analysis in refining rapid response strategies when APHIS confirmed the presence of soybean rust on November 10, 2004 in Louisiana. ERS extended this work to examine the value to

producers of USDA's coordinated framework to detect and report the presence of Asian soybean rust in different producing areas and released a report in 2006.

In addition to ERS-led analyses of invasive species issues, PREISM allocated about \$6.8 million in extramural research cooperative agreements through a peer-reviewed competitive process in FY 2003-08. About \$1.1 million per year were allocated for extramural agreements in FY 2005 and FY 2006; \$950,000 was allocated in FY 2007 and \$970,000 in FY 2008. **No funds have been allocated since FY09.**

PREISM-funded researchers are addressing important issues. For example, a Virginia Polytechnic Institute and State University research team collaborated with APHIS staff to analyze a rule to allow importation of avocados from Mexico, using a framework developed under a PREISM-funded agreement. The framework and economic analysis were published in the Federal Register with the APHIS rule. PREISM-funded researchers, as part of their projects, are collaborating with agencies to address invasive species issues and decisions, such as the coordination of prevention and control strategies for Brown Tree Snakes and *Miconia calvescens* in Hawaii, management of cheat grass, management of diseases transmitted between livestock and wildlife, insect resistance management in strawberry production, responses to outbreaks of foreign animal diseases, and prioritizing invasive plant management by public agencies. At the invitation of the Council on Food, Agricultural, and Resource Economics (C-Fare) and the Weed Science Society of America (WSSA), Muniswamy Gopinath (Oregon State U.) and Bruce Maxwell (Montana State U.) briefed congressional staff about their PREISM-funded projects on May 5, 2006.

ERS organizes workshops each year to provide a forum for dialogue on economic issues associated with agricultural invasive species.

Following are some preliminary findings from PREISM-funded research projects:

- Prevention and management resources should be allocated to species and strategies with the highest return (in terms of damage reduction over time). Ideally, marginal benefits and costs should be equal across species and strategies.
- Decision-support tools that follow sound economic principles and reveal underlying scientific assumptions and value judgments provide a basis for expert and stakeholder involvement in decision-making and promote efficient allocations of funds.
- Optimal invasive species management strategies depend upon the stage of the invasion and associated rates of growth and spread. Eradication may be optimal for small invasions; reduction to a containment level for larger invasions. If eradication is feasible, the effort will reduce discounted damages more if it occurs early when populations are small. Delays result in more damages. If total cost increases rapidly as population increases, eradication when the population is small followed by prevention may be the best strategy.
- Under-funded eradication or management efforts can be cost-ineffective or wasteful, with little or no effect on invasive species growth and total damage. Higher initial expenditures can reduce long term damages and control costs, even if the species is not eradicated.
- For established invasive species infestations, per unit costs of removal can increase as populations decrease or become more isolated, making complete eradication difficult or cost-inefficient. In some cases, accommodation to low levels of invasion is economically preferable to the high cost of eradication. The higher is the cost of removal, the larger the residual population that will remain which will need increased surveillance and continual management.
- Higher invasive species infestation or population growth rates reduce benefit-cost ratios of control efforts, and at high

enough rates, control might not be worthwhile. If population has surpassed that of maximum growth rate, the best strategy could be a pulse-like effort that drives populations below a critical population level and growth rate, followed by containment strategy.

- Probability of occurrence maps for invasive weeds based on GIS and other inventory or survey data and related population growth rates can improve weed management efficiency by reducing: 1) costs by targeting sites to monitor invasiveness, and/or 2) damage by initiating control of highly invasive populations before they spread.
- Coordination of regulations across U.S.-Canada, State, and provincial boundaries could: 1) more effectively reduce the cross-border spread of exotic horticultural plants that become invasive, and 2) reduce incentives for cross-border firm relocations to take advantage of more lenient regulations.

Ecological and agronomic differences influence cross-State differences in noxious weed and weed-seed lists, but stakeholder lobbying also has significant effects.

Important PREISM outputs and accomplishments are documented in the 2003-2011 PREISM activities report (<http://www.ers.usda.gov/publications/AP/AP056/>).

Beginning in 2007, **NIFA's** National Research Initiative (NRI) Program, Biology of Weedy and Invasive Species in Agro ecosystems, has required an economic component in the integrated projects it funds. Specifically, the focus of such programs is the development, delivery, and implementation of ecologically-based, invasive species management programs (e.g. use of cover crops, grazing, tillage, and biocontrol agents) that include economic decision support tools to evaluate tradeoffs of different management strategies. A total of \$4 million was awarded such projects. This priority was continued in the Agricultural and Food Research Initiative (AFRI) grants program in FY09 with an additional priority focusing on the abundance of weedy and invasive species and the individual

and/or collective impacts of these species on a broad suite of ecosystem services, both market and non-market, and that can be used to evaluate tradeoffs of different management strategies. Although the Biology of Weedy and Invasive Species in Agro ecosystems Program was discontinued in AFRI in FY2010, a new grant program was offered through the AFRI Foundation Program for FY2011 entitled “Controlling Weedy and Invasive Plants” with an emphasis on herbicide resistance management. It is anticipated that this program will continue in FY12.

USFS researchers participated in a study funded by The Nature Conservancy, through the University of California at Santa Barbara’s National Center for Environmental Analysis and Synthesis. The team recently published a paper that provides the most comprehensive estimates of the costs of non-native forest insects currently available for the United States, the probability of future costs, and by extension, the benefits of reducing the rate of invasion. This work can be used in quantitative cost-benefit analysis of various exclusion measures for minimizing invasive species introductions.

- The analysis indicates that the cost of non-native forest insects is largely borne by homeowners and municipal governments, large constituencies that may not be adequately considered in most analyses. For all guilds, local government expenditures and residential property value losses were the two highest cost categories. Household expenditures were also high, which was partially reflected in property value loss.
- Timber value losses are relatively modest, often an order of magnitude lower than local government expenditures. Timber mortality induced by poster pests constituted a small fraction of total timber volumes harvested from all tree species, so the impact on timber supplies are likely to be minimal. However, future biological invasions could have more severe impacts on timber species.
- More than 450 non-native forest insects are established in the United States. While the majority of these species have not caused detectable damage, 62 species have been reported to

cause noticeable impacts (above background levels) to live forest trees. The “poster pests” identified for this study are each the most damaging species of its guild to date. They include the emerald ash borer in the borer guild, the hemlock woolly adelgid in the sap feeder guild, and the gypsy moth in the foliage feeder guild.

- Pests from the borer guild, which often arrive on wood packaging materials, generally exacted the highest total costs across sectors. At an estimated \$1.7 billion in local government expenditures and approximately \$830 million in lost residential property values each year, borers’ economic impacts were several times greater than impacts from other guilds. Of the three guilds, borers were represented by the fewest species, but a high proportion of them (20%) are damaging.
- The extent of damage caused by borers is particularly troubling because of the dramatic increase in rates of borer introductions over the last 30 years. Borers accounted for 56% of forest insect invaders detected from 1980-2006, compared to just less than 11% before 1930. This most likely result from the increased importation of wood packing material that harbors borers. Our analysis indicated that there is a 32% risk that a new borer that is as damaging as, or more costly than, the emerald ash borer will invade in the next 10 years.
- Sap feeders accounted for the largest proportion of the insects in our database, but relatively few cause tree mortality or substantial damage. Of the three guilds, sap feeders caused the least timber value loss; and the timber value loss caused by sap feeders was less than 5% of that caused by borers. Efforts to control or manage sap feeders received the fewest federal dollars (\$14 million annually), although they caused substantial losses in real estate values - approximately \$260 million per year.

- Costs associated with foliage feeders were substantially lower than costs associated with borers for all categories except annual federal expenditures, which were slightly greater (\$110 million for foliage feeders and \$92 million for borers). Foliage feeders were estimated to cause approximately \$410 million per year in lost property value. Foliage feeders, such as gypsy moth, typically cause mortality only if consecutive years of severe defoliation occur, or under exacerbating circumstances such as drought, which is reflected in the lower costs of this guild.

Non-native forest insects and the damages they inflict are not unique to the United States. Insects native to the United States have spread to Europe and Asia and are causing damage to forests, and decision-makers in those countries are confronting issues similar to what we face in the United States. Our new analytical framework can be used in any country where data are available and can be easily adapted for estimating costs in a variety of natural resource disturbances in addition to invasive species, including fire, disease, and water quality, at scales from municipalities to nations.

Reference: Aukema, et al. 2011. Economic Impacts of Non-Native Forest Insects in the Continental United States  
<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0024587>

## **B. USDA progress on ISAC recommendations from the March 2004 meeting**

### **2. ISAC recommendation: What are NISC agencies doing to avoid harm?**

USDA has eight agencies included in its invasive species portfolio: Forest Service (FS), Natural Resources Conservation Service (NRCS), Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS), Economic Research Service (ERS), Foreign Agricultural Service (FAS),

Farm Service Agency (FSA), and National Institute of Food and Agriculture (NIFA, formerly CSREES, the Cooperative State Research, Education and Extension Service).

Securing input from the USDA agencies, the USDA Senior Invasive Species Coordinator created the USDA DO NO HARM REPORT, a report to ISAC and NISC, by fiscal year, including 3 categories of activities:

- a) Invasive Species Program activities USDA agencies are carrying out to do no harm;
- b) The way in which, when they do carry out other agency programs activities, they are also designed to do no harm; and
- c) A list of activities that ARE doing harm and the future actions the agency will take to change the activities so that they do no harm.

Within the above categories, agencies include their own activities as well as activities that are coordinated with other Federal agencies, per the mandate under the Invasive Species Executive Order.

The following Do No Harm reports have been presented to ISAC (meeting date in parenthesis):

- FY04 report NRCS, APHIS, ARS, CSREES & ERS (Oct. 04)
- FY04 report for US Forest Service (Feb. 05)
- FY05 report for NRCS, APHIS, CSREES, ERS & FS (Oct. 05)
- FY05 report for ARS (April 06)
- FY 06 report for FS, NRCS, CSREES & ERS (May 07)
- FY 06 USDA (APHIS) Do No Harm Report Part 2 (Oct. 07)
- FY 07 USDA Do No Harm Report (May 08)
- FY 08 USDA Do No Harm Report (May 09) for APHIS, ARS, ERS, CSREES, ERS, NRCS & USFS.
- FY09 USDA Do No Harm Report (Feb. 10) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.
- FY10 USDA Do No Harm Report (March 2011) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.

**The FY 11 USDA Do No Harm report is in preparation.**



Copies of all the USDA reports are available online at <http://www.invasivespeciesinfo.gov/resources/orgfedusda.shtml>

3. **ISAC recommendation: NISC should request all Federal agencies to identify existing grant programs, cooperative agreements and other mechanisms that are potential sources of funds for invasive species projects.**

USDA compiled and published a comprehensive document in 2005 with grant opportunities for work on research, technical assistance or management of invasives. The document has been updated annually. The “2012 USDA Grant and Partnership Programs That Can Address Research, Technical Assistance Prevention and Control” is in preparation. Past reports are available at [www.invasivespeciesinfo.gov](http://www.invasivespeciesinfo.gov)

**C. USDA Progress on ISAC recommendations from the October 2005 meeting**

4. **ISAC recommendation: NISC policy liaisons provide guidance to ISAC Leadership and Coordination Subcommittee regarding issues the subcommittee should address.**

USDA would appreciate ISAC’s support to (a) promote strengthening Federal collections, identifications and **systematics** efforts and capabilities; (b) promote increasing support for research (knowledge and models) and increasing the awareness of decision makers about the **economic impacts** of invasive species; and (c) strengthening **research on invasive species and climate change**.

**D. USDA Progress on ISAC recommendations from the September 2006 meeting**

5. **ISAC recommendation: That NISC support adequate and continuing funding and staffing for classical systematics research, education and operations – including the care and maintenance of systematics collections.**

Systematics clarifies the origins and movements of invasive pests, parasites and pathogens. Advances in biotechnology (including DNA sequencing, comparative genome analysis, distributed databases and high speed telecommunications) can substantially strengthen and accelerate governmental responses to these threats.

ARS funding for systematics:

FY 2008	\$20,935,632
FY 2009	\$21,189,347
FY 2010	\$21,982,411
FY 2011	\$20,135,727 (Enacted)
FY 2012	\$19,732,014 (President's Proposed Budget)

Agricultural productivity depends on access to key inputs (rich soils, fertilizers, water, and energy), the inherent genetic potential of crops and livestock, and effective defenses against diseases, pests, and environmental extremes that reduce agricultural production and producer profitability. The capacity of agricultural research effectively rests on a dynamic foundation of invaluable living animal, plant, and microbial genetic resources, and research tools in the form of scientific collections of preserved biological specimens. Such scientific collections are essential for ARS scientists to advance the science of systematics. Funding to strengthen national collections proposed in the President's FY 2011 budget was not included in the FY 2011 continuing resolutions. Initiatives to support collections were included in the President's FY 2012 budget as noted below to:

- Enhance capacity to conserve a broad diversity of National plant germplasm system resources (\$3,300,000)
- Enhance plant and microbial collections' capacity (\$1,200,000).
- Enhance animal and microbial collection' capacity (\$750,000).
- Enhance capacity to conserve insect germplasm and insect systematics' capacity (\$750,000)

A worldwide shortage of critical expertise in systematics was recognized and documented in a three-year analysis of the field. The situation report is available on the [www.itap.gov](http://www.itap.gov) Web site.

**E. USDA Progress on ISAC recommendations from the May 2009 meeting**

**6. ISAC Recommendation: Establish the Sentinel Plant Network. Support and facilitate the establishment of the Sentinel Plant Network to facilitate the early detection reporting and prevention of pests and pathogens.**

The National Plant Diagnostic Network (NPDN) and the American Public Gardens Association (APGA) received Farm Bill 2009 grant funding. This partnership makes it possible to extend NPDN's diagnostic and "First Detector" training expertise to the diverse collections and public outreach programs of the more than 500 APGA member gardens across the country. The two organizations work hand in hand, with NPDN taking the lead on content development and APGA working to disseminate this information through its membership by recruiting gardens to participate in the Sentinel Plant Network, conducting training workshops for professionals, and producing educational outreach materials. To date, 66 public gardens have joined the Sentinel Plant Network.

If this network were expanded to include gardens overseas (e.g., through the Botanic Gardens Conservation International), it would inform prevention measures by monitoring North American plants exposed constantly to pests in foreign environments.

USFS Forest Health Protection program is continuing a Sentinel Trees project in China. In China, the project is focusing on existing plantings of North American tree

species of interest. The existing plantings occur in botanical gardens, nurseries, and plantations. The implementation strategy for this project has 3 components; 1) looking at the grey literature for information on North American species of interest; 2) cataloging insects associated with selected host trees by trapping, chemical drenching, sweep nets or other techniques; and 3) periodic surveys of selected host trees. These projects develop techniques and procedures that we can use operationally in these and other selected countries.

**7. ISAC Recommendation: Revise and draft NEPA guidance.** ISAC recommends that NISC and the Council on Environmental Quality (CEQ) revise and draft guidance under the National Environmental Policy Act (NEPA), and make it available for public comment by October 1, 2009.

USDA and APHIS participated in the latest review of the proposed invasive species guidance in 2009.

**8. ISAC Recommendation: Provide data on NISC member agencies' invasive species budgets.** ISAC recommends that NISC member agencies annually provide in writing at the fall ISAC meeting their invasive species budgets for the preceding fiscal year in actual dollars and the budget for the current fiscal year (requested and enacted). The budget document should be divided into seven categories: Prevention, EDRR, Control and Management, Restoration, Research, Education and Public Awareness, and Leadership/International Coordination.

**Funding Available for Invasive Species General Categories**

**Departmental Template - USDA**

Dollars in Thousands

<b>USDA</b>	<b>Agency</b>	<b>FY 2009 Actual</b>	<b>FY2010 Actual</b>	<b>FY 2011 Enacted</b>	<b>FY 2012 Budget</b>
Prevention	APHIS	\$ 103,217	\$ 108,447	\$ 107,045	\$ 107,463
Prevention	ARS	\$ 5,316	\$ 5,691	\$ 5,440	\$ 5,381
Prevention	NIFA	\$ 3,152	\$ 3,123	\$ 2,241	\$ 2,507
Prevention	ERS	\$ -	\$ -	\$ -	\$ -
Prevention	FS	\$ 33,652	\$ 38,218	\$ 36,915	\$ 35,203
Prevention	NRCS	\$ 8,189	\$ 8,655	\$ 8,605	\$ 8,605
<b>Prevention Totals</b>		<b>\$ 153,526</b>	<b>\$ 164,134</b>	<b>\$ 160,246</b>	<b>\$ 159,159</b>
Early Detection & Rapid Response	APHIS	\$ 241,460	\$ 232,985	\$ 223,289	\$ 239,423
Early Detection & Rapid Response	ARS	\$ 7,598	\$ 8,087	\$ 7,838	\$ 7,425
Early Detection & Rapid Response	NIFA	\$ 5,916	\$ 5,860	\$ 4,278	\$ 4,650
Early Detection & Rapid Response	ERS	\$ -	\$ -	\$ -	\$ -
Early Detection & Rapid Response	FS	\$ 12,700	\$ 700	\$ 590	\$ 9,590
Early Detection & Rapid Response	NRCS	\$ 8,189	\$ 8,655	\$ 8,605	\$ 8,605
<b>Early Detection &amp; Rapid Response Totals</b>		<b>\$ 275,863</b>	<b>\$ 256,287</b>	<b>\$ 244,600</b>	<b>\$ 269,693</b>
Control	APHIS	\$ 250,935	\$ 271,990	\$ 298,179	\$ 245,932
Control	ARS	\$ 97,875	\$ 100,264	\$ 94,752	\$ 86,159
Control	NIFA	\$ 14,178	\$ 13,997	\$ 10,536	\$ 10,558
Control	ERS	\$ -	\$ -	\$ -	\$ -
Control	FS	\$ 41,595	\$ 42,664	\$ 49,962	\$ 46,465
Control	NRCS	\$ 81,891	\$ 86,549	\$ 86,049	\$ 86,049
<b>Control Totals</b>		<b>\$ 486,474</b>	<b>\$ 515,464</b>	<b>\$ 539,478</b>	<b>\$ 475,163</b>
Research	APHIS	\$ 46,163	\$ 48,988	\$ 48,078	\$ 64,090
Research	ARS	\$ 122,153	\$ 124,888	\$ 122,166	\$ 120,226
Research	NIFA	\$ 18,615	\$ 18,370	\$ 13,832	\$ 13,799
Research	ERS a/	\$ 1,000	\$ 1,000	\$ 1,000	\$ 835
Research	FS	\$ 35,464	\$ 37,463	\$ 37,463	\$ 34,973
Research	NRCS	\$ -	\$ -	\$ -	\$ -
<b>Research Totals</b>		<b>\$ 223,395</b>	<b>\$ 230,709</b>	<b>\$ 222,539</b>	<b>\$ 233,923</b>
Restoration	APHIS	\$ -	\$ -	\$ -	\$ -
Restoration	ARS	\$ 294	\$ 296	\$ 353	\$ 353
Restoration	NIFA	\$ 2,445	\$ 2,416	\$ 1,808	\$ 1,838
Restoration	ERS	\$ -	\$ -	\$ -	\$ -
Restoration	FS	\$ 5,708	\$ 7,222	\$ 7,580	\$ 7,045
Restoration	NRCS	\$ 24,567	\$ 25,964	\$ 25,814	\$ 25,814
<b>Restoration Totals</b>		<b>\$ 33,014</b>	<b>\$ 35,898</b>	<b>\$ 35,555</b>	<b>\$ 35,050</b>
Ed & Public Awareness	APHIS	\$ -	\$ -	\$ -	\$ -
Ed & Public Awareness	ARS	\$ 44,945	\$ 46,356	\$ 44,342	\$ 40,922
Ed & Public Awareness	NIFA	\$ 4,126	\$ 4,111	\$ 2,996	\$ 3,445
Ed & Public Awareness	ERS	\$ -	\$ -	\$ -	\$ -
Ed & Public Awareness	FS	\$ 500	\$ -	\$ -	\$ -
Ed & Public Awareness	NRCS	\$ 40,946	\$ 43,275	\$ 43,025	\$ 43,025
<b>Ed &amp; PA Totals</b>		<b>\$ 90,517</b>	<b>\$ 93,742</b>	<b>\$ 90,363</b>	<b>\$ 87,392</b>
Leadership/Int. Cooperation	APHIS	\$ 49,014	\$ 53,291	\$ 56,322	\$ 47,368
Leadership/Int. Cooperation	ARS	\$ -	\$ -	\$ -	\$ -
Leadership/Int. Cooperation	NIFA	\$ 3,425	\$ 3,405	\$ 2,520	\$ 2,776
Leadership/Int. Cooperation	ERS	\$ -	\$ -	\$ -	\$ -
Leadership/Int. Cooperation	FS	\$ 595	\$ 180	\$ 355	\$ 350
Leadership/Int. Cooperation	NRCS	\$ -	\$ -	\$ -	\$ -
<b>Leadership/Int. Cooperation Totals</b>		<b>\$ 53,034</b>	<b>\$ 56,876</b>	<b>\$ 59,197</b>	<b>\$ 50,494</b>
<b>Department Totals</b>		<b>\$ 1,315,823</b>	<b>\$ 1,353,110</b>	<b>\$ 1,351,978</b>	<b>\$ 1,310,874</b>

a/ ERS contributes to the USDA's invasive species efforts through the pesticide use and pesticide management systems economic research and analysis program, which contributes to Integrated Pest Management (IPM), Food Quality Protection Act implementation, invasive species and the areawide IPM programs.

**APHIS Funding Available for Invasive Species General Categories, including FY11 Appropriations– USDA Departmental Template (Dollars in Thousands).**

<b>Category</b>	<b>2009 Actual</b>	<b>2010 Estimate</b>	<b>2011 President's Budget</b>	<b>FY 2011 Approp*</b>
Prevention	\$103,217	\$103,217	\$112,864	\$107,045
EDRR	\$241,460	\$248,733	\$247,266	\$223,290
Control & Management	\$250,935	\$308,840	\$282,153	\$295,185
Restoration	\$0	\$0	\$0	\$0
Research	\$46,163	\$49,072	\$58,577	\$51,073
Education & public awareness	\$0	\$0	\$0	\$0
Leadership/Int. Cooperation	\$49,014	\$56,430	\$49,108	\$56,322
<b>Total</b>	\$690,789	\$775,939	\$746,886	\$732,915

**\*Includes reprogramming**

**F. USDA Progress on ISAC recommendations from the June 2010 meeting**

**9. ISAC Recommendation: That agency partners submit their annual reports according to the deadlines specified in Performance Element OC.7.1.1 of the NISC 2008-2012 National Invasive Species Management Plan, which reads: *“Each NISC member submits one formal (draft and final) report per fiscal year, tracking the implementation of the NISC 2008 Plan. NISC Staff will complete a streamlined reporting template within three months. Annual summary report by NISC is available on its website by February 28 of each year along with the individual NISC member reports.”***

All USDA agencies submitted their responses on FY09 and FY10 NISC Plan Implementation activities to NISC by the deadline for publication.

**10. ISAC Recommendation: That NISC adopts the Invasive Species and the Green Economy paper and recommendations within (see below).**

**We (ISAC) call on the member Departments and Agencies of the National Invasive Species Council (NISC) and potential partners to:**

**□ Establish a national survey of invasive species, to be administered at the state-level. Support this program by substantially increasing Federal and state jobs at all technical levels to survey, identify, map, catalog, and model patterns/trends of invasive plants and animals. Include the existing state and regional invasive species committees/councils in the development and implementation process. Place priority on invasive species known or projected to have substantial impacts.**

APHIS assists state partners via its National Cooperative Agricultural Pest Survey Program which uses appropriated funds and with funds from Section 10201 of the Farm Bill.

The Cooperative Agricultural Pest Survey (CAPS) Pest Detection program strengthens APHIS' emergency preparedness efforts through the early detection of exotic, harmful, or economically significant plant pests, pathogens, and noxious weeds. Discovering these pests before they spread can prevent small outbreaks from becoming emergencies. APHIS and its State cooperators carry out surveys for pests of regulatory significance through the CAPS program. CAPS enable APHIS to maintain a comprehensive network of cooperators and stakeholders to facilitate its mission of safeguarding America's plant resources. In fiscal year 2011, State cooperators were provided about \$6.8 million through CAPS, and targeted 295 pests, pathogens, and noxious weeds in 130 commodity- and taxon-based surveys. A total of 18 pests and pathogens were detected (either through CAPS surveys or reported

to APHIS) and recorded in an APHIS database as new or re-introduced to the United States. All of these pests were significant and listed as reportable/actionable quarantine pests. Examples include *Rhynchophorus ferrugineus* and *R. palmarum* (Red palm weevil and South American palm weevil, respectively) in California, *Planococcus minor* (Passionvine mealybug) in Florida, and *Melampsoridium hirsutikanum* (Alder rust) in California. Overall, the program detected 83.3% of the known significant introductions of plant pests or diseases before they spread from the area of original colonization and caused significant economic or environmental damage. The program is continuing to develop commodity-based and resource-based surveys. These surveys enable the program to target high-risk hosts and commodities, gather data about pests specific to a commodity, and establish better baseline data about pests that were recently introduced in the United States.

Section 10201 of the 2008 Farm Bill directs the Secretary of Agriculture to make available \$50 million to APHIS from Commodity Credit Corporation for early plant pest detection and surveillance, for threat identification and mitigation of plant pests and diseases, and for technical assistance in the development and implementation of audit-based certification systems and nursery plant pest risk management systems. In fiscal year 2011, APHIS funded over 300 projects with hundreds of cooperators in 50 state departments of agriculture, universities, other agencies in USDA, and non-profit organizations. Over the last two years, Section 10201 projects have played a significant role in many USDA successes in protecting American agriculture and educating the public about the threat of invasive species. These successes include, among many others, the eradication of plum pox virus in Pennsylvania and Michigan (and under official control in New York), and a recent Mediterranean fruit fly outbreak in Florida, surveys for European grapevine moth in California, the 2010 national survey of honey bee pests and diseases, and the production of a documentary (“Lurking in the Trees”) to increase public awareness of the Asian long horned beetle. Section



10201 resources make the early detection and rapid response to dangerous invasive species a reality. To date, 13 separate exotic fruit fly infestations in California have been detected and eradicated without accessing CCC emergency resources. Section 10201 funding directly strengthens and protects agriculture production and protection in all 50 States. This Farm Bill provision truly supports and enhances the Federal/State partnership in safeguarding the agriculture production capacity of the United States.

US Forest Service R&D's Forest Inventory and Analysis group now includes invasive plants in their normal monitoring procedure. The list of plants included in the survey varies by region. A guide produced to help identify the 44 plants inventoried by the Northern Region, can be viewed at: <http://www.treesearch.fs.fed.us/pubs/34183>. Six FIA invasive plant state survey results were published, and can be obtained from the TreeSearch website [www.treesearch.fs.fed.us](http://www.treesearch.fs.fed.us). A report on the results of surveys in the Southern Region can be viewed at: <http://www.invasive.org/fiamaps/>. Custom maps can be generated using the FIDO tool at: <http://apps.fs.fed.us/fido/>. USFS Forest Health Protection program also provides states with funding for surveys of priority pests.

The USFS has been requested by USDA Office of the Inspector General to develop an inventory plan for all aquatic and terrestrial invasive species impacting the National Forest System, per the OIG recommendation in Audit Number 08601-7-AT.

**□ Supplement the Federal and state workforce by creating contract jobs in the private sector and offering grants to encourage business innovation and entrepreneurship (e.g., native plant and seed companies, ecosystem restoration, invasive species mapping and control services, and education/outreach programs).**

USFS-National Forest System has outlined a national approach to creating job opportunities in the private sector to detect, prevent, control, and eradicate aquatic and terrestrial invasive species across the National Forest System. This proposed approach capitalizes on the growth of the invasive species management industry and the

large amount of work that was not inherently governmental. The approach also built job-creating partnerships to help raise awareness in the communities about the threat of invasive species to the national economy.

**□ In order to counter the dramatic decline in taxonomic capacity (i.e. the decrease in the number of people trained to identify specific species), provide grants to support research/education/training in taxonomy as well as job creation for taxonomists and parataxonomists (people who lack formal higher-level education, but who are trained to undertake species identification tasks).**

In fiscal year 2011, APHIS partnered with universities, state departments of agriculture, ARS and USFS to develop diagnostic resources to facilitate identification of invasive plant pests and diseases. Examples of these diagnostic resources include the following: *Citrus ID: Hosts and Potential Hosts of Citrus Pests and Diseases*, *A Resource for Pests and Diseases of Cultivated Palms*, *Dried Botanical ID, A Resource for Wood Boring Beetles of the World*, and *Common Nymphal Grasshoppers of the Western United States*.

APHIS taxonomic expertise and capacity are crucial to ensuring accurate identification of plant pests intercepted at our ports of entry by the Department of Homeland Security's Customs and Border Protection (CBP) Agriculture Specialists. APHIS identifiers rely on their own national specialists and those at ARS for rapid confirmation of plant pest species from imported commodities on hold at ports of entry. Because of the diversity of plant pests (insects, mites, fungi, bacteria, viruses, nematodes, snails, and invasive plants), multiple specialists are required for each discipline.

**□ Capitalize invasive species prevention and management needs (e.g., along roadways and on government lands) to create entry-mid level, high impact social development programs for youth and persons at risk (e.g., minimum security prison population). Establish Federal initiatives and/or offer grants to states and tribes. USFS please respond.**

NRCS district offices (one in almost every county of the U.S) work very closely with the local community in addressing natural resource issues of the area, including invasive species. Opportunities for social development at the local level also exists through the NRCS “Earth Team” volunteer program (see <http://www.nrcs.usda.gov/wps/portal/nrcs/main/?ss=16&navtype=BRrowsebysubject&navid=8101300000000000&pnavid=8100000000000000&ttype=main&cid=null&position=RELATEDTOPICS&pname=Volunteers%20%7C%20NRCS>).

Also, through the Conservation Innovation Grants (a program within the Environmental Quality Incentives Program (EQIP)), state or county organizations (and others) may propose social development programs as long as EQIP-eligible landowners are involved.

USFS-National Forest System is building new directives which require proactive management of invasive species in the National Forest System, and across the broader landscape, with the goal of restoring the condition of degraded watersheds. The new manual and accompanying handbook will provide the policy foundation on which to build long lasting opportunities to engage with youth and other external workforce groups.

**□ Substantially increase Federal and state agency staffing in the areas of import/border inspection for agriculture and wildlife, specimen identification, pest risk analysis (including pre-import screening), and invasive species program management (esp. public education/outreach, regulatory enforcement, and early detection/rapid response).**

DHS/Customs and Border Protection (CBP) continues to place more emphasis on agriculture pest detection. Recent training was provided to CBP Agriculture Specialists to place higher priority and increase ability to detect forest pests that are entering in wood packing material. APHIS SITC (law enforcement) continues to increase collaboration with CBP in order to do internal investigations on international cargo beyond the port environs. New weed risk analysis methodologies have been developed and validated on over 200 known species. These methods are currently being implemented as part of a suite of risk analysis approaches designed for a major revision of the regulations for the import of propagative material and

also to identify species which may be regulated as Federal Noxious Weeds.

**□ Establish/strengthen internships in invasive species identification, control/eradication, mapping, and monitoring for high school and college students. Support comparable Federal, state, tribal, and non-profit initiatives.**

Many ARS laboratories employ and train students at various levels of their education in current technologies used in research. In addition, ARS has numerous cooperative agreements with university scientists who employ and train students at the undergraduate and graduate level in various areas of research that utilize modern technologies applicable to solving issues related to invasive species.

USFS State and Private Forestry Program has provided support in FY 2011 to EDD Maps (see <http://www.eddmaps.org/>) internet effort for use nationwide by cooperators, including Cooperative Weed Management Associations, and students groups, for mapping and monitoring invasive plants.

USFS National Forest System units are collaborating with local landowners, state governments, NGO's and other partners to collect and record invasive species infestation data associated with populations located on National Forests and Grasslands. Invasive species inventory data (including spatial data) recorded in the USFS Natural Resource Information System (NRIS) database is being shared with external partners using a new batch-loading approach to transfer information beyond the security firewalls.

APHIS provided \$100,000, as a pilot through NIFA to offer funding for 6 week systematics internships to university students to work with systematic taxonomists of important families/classes of organisms. The needs to have a U.S. expert trained in any specific taxon were identified by APHIS. Specialists in a specific important taxon who are retired or retiring will be recruited to train one or more interns. The internships might have to go far afield, perhaps Canada or Australia, for example, to find remaining capability. The need for expertise for taxa that are still outside of the U.S. would be

identified by APHIS. Taxonomic experts outside of the US, for example in Canada, might also be contacted to receive interns.

**□ Develop stronger relationships between the Federal government and green industries potentially impacted by and/or managing invasive species. For example, work with the Invasive Species Advisory Committee (ISAC) and/or NISAW to organize an Invasive Species & Green Industries Summit.**

**□ Mandate that, prior to receiving Federal support: 1) renewable energy projects (esp. solar, wind, and biofuel) have adequate invasive species mitigation plans in place and 2) biofuel developers/producers demonstrate that nonnative species are of low invasion risk (to the propagation site, area of potential dispersal, and along transport pathways) based on a competent invasive species risk analysis.**

Any funding provided to private landowners by NRCS includes the requirement for conservation plans, a part of which is an assessment of the risk of invasive species and a plan for mitigating negative impacts from invasive species.

USFS-National Forest System is developing new policy (Forest Service Manual and accompanying Forest Service Handbook) which will require invasive species management considerations to be part of all planning and implementation of energy development and transmission programs, transportation, and other land management activities conducted on the National Forest System. The new policy will prohibit the use of invasive species for bio-fuels production on National Forests and Grasslands.

**G. USDA Progress on ISAC recommendations from the December 2010 meeting**

- 11. ISAC Recommendation: That NISC member agencies such as the Army Corps of Engineers, the Department of Agriculture (ARS and APHIS), and others, expand biological control efforts for invasive species, and in**

**particular those in aquatic systems, which tend to have limited options that are often very costly. These efforts are justified based on economic analyses that suggest an average beneficial return of 10-17 fold for each dollar spent on biological control.**

APHIS collaborated with the Army Corps of Engineers to produce and distribute aquatic biocontrol agents for Giant Salvinia, Hydrilla, and water hyacinth which eliminates the application of herbicides to navigable and environmentally sensitive waterways clogged with these invasive weeds.

Although in fiscal year 2011, APHIS did not provide additional funding to the Army Corps of Engineers for these projects, the Corps did continue the work at a reduced level.

In FY 2011, USFS published studies on biological control research for the following invasive species: yellow starthistle, scotch broom, yellow and Dalmatian toadflax, cheatgrass, and emerald ash borer.

**12. ISAC Recommendation: That NISC member agencies continue to support and encourage participation in National Invasive Species Awareness Week (NISAW).**

USDA, NRCS, NIFA, USFS, ARS and APHIS were very active participants in the 2011 NISAW activities. USDA agencies will continue participating in the future.

**13. ISAC Recommendation: That NISC adopts the Invasive Species and the Climate Change paper (attached) and recommendations within.**

## **Invasive Species and Climate Change**

*Approved by ISAC on December 9, 2010*

### **Issue**

Climate change interacts with and can often amplify the negative impacts of invasive species. These interactions are not fully appreciated or understood. They can result in threats to critical ecosystem functions on which our food system and other essential provisions and services depend as well as increase threats to human health. The

Invasive Species Advisory Committee to the National Invasive Species Council recognizes the Administration's commitment to dealing proactively with global climate change. However, unless we recognize and act on the impact of climate change and its interaction with ecosystems and invasive species, we will fall further behind in our effort to prevent, eradicate and manage invasive species. We are already seeing such climate change impacts and need to act now.

### **Decisive Action is Required**

Policy makers at all levels of government must integrate invasive species considerations into climate change policies. The strong interrelationships between climate change and the dynamic nature of invasive species, changing ecosystems, and human activities necessitate such integration. It is critical that practices be developed that strengthen environmental monitoring, management and control of invasive species to minimize impacts on the broad range of ecosystem resources upon which humans depend. The physical process of climate change interacts with the biological and physical processes of the earth's ecosystems, and these are, in turn, linked to the socio-economics of human activities.

### **Background**

Climate change and biological invasions are dynamic, interconnected and interdependent phenomena. They affect human health and well being through their impact on resources, goods and services provided by ecosystems. These ecosystems are critical to agriculture and forests, food security, water supplies and other natural resources. They affect wildlife, recreation, and public health and safety nationwide. Even without climate change, invasive species have repeatedly and rapidly disrupted many ecosystems in the US. While climate change may have either a positive or negative effect on individual invasive species, which can be projected in various models, it is likely to have a negative effect on many specialist native species that are more restricted in their ranges. Invasive species often show higher ability to acclimate to environmental change compared to related native species. Thus, invasive species that tend to be more adaptable are expected to expand and further compromise sensitive native plant and animal communities.

The ongoing change in climate and the expected speed of this change are likely to exacerbate problems by increasing the ability of invasive species to become established, spread through, and disrupt ecosystems. At a minimum, invasive species can reshuffle the landscape for agricultural services and resources including food, fuel, feed, fiber and forests along with quickly changing land use decision pressures. As a parallel, in marine and/or aquatic ecosystems, climate change can induce fisheries collapse as mid-trophic structure species are lost opening new potential niches for tolerant invasive species. Finally, climate induced shifts in invasive disease vectors, such as those for malaria or avian flu, are of increasing concern.

Evidence indicates that climate change may alter the efficacy of management strategies for invasive species. Furthermore, changes in land cover caused by invasive plants can influence weather and climate. In some regions, both climate change and invasive species are likely to increase the frequency of wildfires which in turn will further facilitate the establishment of fire adapted invasive species leading to even more frequent and intensive fires.



## Recommendations

### **Policy and Legal Responsibilities**

We applaud the U.S. Department of Interior's establishment of a Climate Change Response Council to synthesize data and coordinate appropriate management of our nation's lands and waters. We acknowledge the U.S. Department of Agriculture's (USDA) recent presentation of the impact of climate change in its publication: "*Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States.*" We fully support the Department of Commerce's National Oceanographic and Atmospheric Administration's (NOAA) proposal to establish the NOAA Climate Service to meet essential national needs.

Executive Order 13112 requires Federal agencies to address invasive species and establishes the National Invasive Species Council to coordinate planning and response. The International Plant Protection Convention requires analyses of pest risk. Agencies may be able to integrate climate change considerations into their existing risk-assessment protocols and procedures. Environmental laws such as the Endangered Species Act and the National Environmental Protection Act (NEPA) can be used more powerfully to address invasive species.

### **Opportunities for Action**

We call on the member Departments and Agencies of the National Invasive Species Council and potential partners to:

**ISAC Recommendation: Use the Global Change Research Act of 1990** (GCRA)48 (PL 101-606) to aggregate information about the implications of a changing climate for invasive species spread so scientific data may be synthesized through existing authorities to inform policy-makers.

ARS includes invasive species as part of its climate change research program. Invasive species research is also conducted in plant and animal production research programs. The ARS climate change research program includes synthesis activities specifically designed to inform policy-makers.

USFS Research & Development has published a synthesis of the literature on interactions of climate change and forest diseases in 2009, which can be viewed at: <http://www.treesearch.fs.fed.us/pubs/33904>. Several FS researchers co-authored a paper in the Feb 2011 special edition on Climate Change of the journal "Plant Pathology", which can be viewed at: <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3059.2010.02406.x/abstract>

USFS Research & Development has devoted significant resources to understanding how climate change affects bark beetle life history and



tree responses to attack. A synthesis paper is accessible at:  
<http://www.treesearch.fs.fed.us/pubs/36133>

**ISAC Recommendation: Streamline and focus agency programs**

to address invasive species climate interactions effectively and efficiently by establishing:

- 1) strategic plans that anticipate climate impacts on invasives,

ARS response: The USDA Climate Change Science Plan includes invasives as a part of Element 1: Understand the direct and indirect effects of climate change on natural and managed ecosystems, including feedbacks to the climate system, and Element 2: Develop knowledge and tools to enable adaptation to climate change and to improve the resilience of natural and managed ecosystems. ARS includes invasives as part of its Climate Change, Soils and Emissions National Program Action Plan as part of Component 3: Enable agriculture to adapt to climate change with Problem statements of: Understand the responses of agricultural systems to anticipated climate change, and Understand the impact of anticipated climate change on endemic and exotic pests, weeds and diseases.

- 2) forward-looking environmental compliance documents (e.g., NEPA, nationwide Environmental Impact Statements on invasives prevention, management, and restoration)

ARS research projects follow the procedures described in the Code of Federal Regulations Title 7, Subtitle B, Chapter V, Part 520 for implementing the National Environmental Policy Act. These procedures assure that research and other activities of the Agricultural Research Service (ARS) comply with the intent of the National Environmental Policy Act of 1969 (NEPA) and appropriate regulations implementing this Act. These procedures incorporate and supplement, and are not a substitute for, CEQ regulations under 40 CFR parts 1500-1508, and Department of Agriculture NEPA Policies and Procedures under 7 CFR part 1b. ARS conducts and supports research as authorized by legislation to support one of the USDA goals of assuring adequate supplies of high quality food and fiber. Information generated through such research often forms the basic data needed to assess the impact of a new technology upon the environment. Large scale projects simulating commercial practices

are normally implemented in cooperation with other agencies of the Federal or State Governments.

and,

3) focus awareness programs to anticipate and manage potential climate driven ecosystem changes.

ARS conducts research on the effects of anticipated climate-driven ecosystem changes. Laboratory, plot-level, landscape, and simulation-focused research are focused on developing risk management tools to maintain the resilience of agricultural systems and the natural resources base (water, soil, air) needed to maintain production and ecosystem services.

**ISAC Recommendation: Assess new climate driven invasion pathways and strengthen prevention programs** to address invasives in ballast water, bio-fouling, interstate and international movement of materials and equipment (e.g., energy development, wildfire response, national defense), and screening of plant and animal imports taking account of climate impacts.

ARS conducts basic and applied research on the interacting effects of climate change on endemic and exotic pests, weeds and diseases. Resistance to management actions designed to control these types of species is being addressed. ARS is also working with APHIS to identify research needs to develop risk-management technologies based on climate events for early warning of outbreaks.

It is the goal of APHIS Veterinary Services to use climate impacts to adjust our risk-based inspection of animal and animal product imports. Currently, APHIS is assisting other countries with early warning of outbreaks (based on climate events such as El Nino), which reduces our risk of introducing pests and diseases in imports.

**ISAC recommendation: Support monitoring and adaptive management** programs for invasive species at the landscape scale so that natural resource managers can identify new threats and respond quickly and appropriately to invasive species in changing climatic conditions.

ARS is conducting research on remote sensing technologies to enable mapping and tracking of invasive species and the effectiveness of eradication measures.

USFS Research & Development is developing a collaborative and inclusive agency inventory, monitoring and assessment strategy (expect publication in FY 2012). This is needed to help implement the new National Forests Planning Rule.

USFS-National Forest System has expanded its corporate record keeping system and integrated survey and inventory information with treatment records to help provide critical information for adaptive management against invasive species. New USFS policy (Forest Service Manual and Forest Service Handbook) call for the use of a structured decision making process and an adaptive resource management approach when dealing with invasive species.

**ISAC Recommendation: Foster collaboration of existing networks** to address the broad geographic nature and altered management of invasive species issues in a time of climate change. This will allow the national response to be coordinated, efficient, and capitalize on current capacities using a synergistic approach.

ARS and APHIS have members in FICMNEW (Federal Interagency Committee for Management of Noxious and Exotic Weeds) and ITAP (federal Interagency Committee for Invasive Animals and Pathogens) to inform other Federal Agencies of our research activities on invasive species and to coordinate efforts among agencies.

ARS and APHIS are having discussions about the importance of considering issues related to pests/pathogens/weeds as the USDA continues to develop its plans and responses to climate change. A joint workshop took place on April 1, 2011 with presentations and open discussion of potential collaboration between ARS and APHIS for scenario development, risk assessment, research needs and priorities, and strategies for funding.

**ISAC Recommendation: Increase research and development** targeted at climate change and invasive species by supporting and expanding the USDA-ARS and US Forest Service Climate Change Programs, as well as competitive research programs such as USDA's Agricultural and Food Research Initiative, the Environmental Protection Agency's Project Grants, NSF's Conservation and Biology program, and NOAA's Sea Grant program. Better understanding of the interaction of climate change and invasive species will

result in more relevant prioritization and management on the ground. This includes recognizing the economic basis for invasive species management decisions and supporting work that integrates economic, ecological and biological data providing policy and management support.

ARS is currently examining its portfolio of research projects relevant to climate change and invasive species. The goal is to expand an informal working group of ARS scientists focused on climate change and invasive species for the purposes of increasing opportunities for collaboration.

NIFA offered a new AFRI Challenge Area Grant Program in FY2011 entitled "Climate Change". This AFRI Challenge Area focuses on the priority to mitigate and adapt to climate change. It supports activities that reduce greenhouse gas emissions, increase carbon sequestration in agricultural and forest production systems, and prepares the nation's agriculture and forests to adapt to changing climates. The long-term outcome for this program is to reduce the use of energy, nitrogen fertilizer, and water by ten percent and increase carbon sequestration by fifteen percent through resilient agriculture and forest production systems under changing climates. In order to achieve this outcome, this program is supporting single-function Research, Education, and Extension Projects, multi-function Integrated Research, Education, and/or Extension Projects, and Food and Agricultural Science Enhancement (FASE) projects that address one of the Program Area Priorities.

Congress proposes to cut USFS Climate change research program in FY 2012.

**ISAC recommendation: Use climate matching and ecological niche models** to prioritize management of species that are most likely to cause the greatest harm in the future as a result of climate change. This will require the Federal response to be coordinated, empowered, and appropriately funded.

ARS responds to priorities for research gathered from customer-stakeholder workshops, science collaborators and Federally-mandated priorities.

NRCS has historically been a key source of this information for ARS. NRCS with its partners are developing tools to estimate the amount of carbon stored and GHG emissions reduced at the field and producer level. [COMET-VR](#) is a web-based, interactive decision support tool that includes the effects of land-management changes and is authorized for voluntary GHG reporting under section 1605(b) of the 1992 Energy Policy Act. It is a cooperative effort between NRCS and Colorado State University. Tools like COMET-VR make it easier for producers to estimate carbon storage and GHG emissions reductions for their entire holdings. The market for carbon credits trading in the form of carbon emissions reduction is in its formative stages and agricultural producers stand to benefit. NRCS has also instituted an Environmental Credit Trading Information Series to answer basic questions in environmental trading. The first document in the series discusses [Carbon Credit Trading on Rangeland](#). ARS is currently in dialogue with APHIS concerning priorities for research and development of relevant technologies.

#### **H. USDA Progress on ISAC recommendations from the June 2011 meeting**

**14. ISAC Recommendation:** To enhance the effectiveness of biological control programs at their inception, ISAC recommends that NISC Departments and Agencies working on biological control of invasive organisms, plan, conduct, and evaluate their programs in the context of an Integrated Pest Management (IPM) approach. This may require integrating biological control in concert with other management options (i.e., physical, cultural, and chemical) to achieve maximum effectiveness. For example, many invasive species are susceptible to both biological control agents and competitive interactions. As a result, using these approaches in concert can provide synergy towards achieving the desired land management objectives. ISAC has previously recommended an IPM approach to invasive management strategies. While most biological control efforts often consider themselves a stand-alone, silver bullet solution, a more integrated approach should increase the probability of success. *This recommendation addresses the National Invasive Species Management Plan, Implementation Task CM.1.2:*

*Identify and address strategic gaps in regional invasive species control and management efforts and tools.*

In support of the Department's Integrated Pest Management (IPM) goals and other IPM needs, ARS currently conducts more than 144 IPM research projects at 56 locations that are focused on minimizing pesticide inputs through the development of classical and augmentation biological control, cultural control, host-plant resistance, behavior modifying chemicals (e.g., pheromone mating disruptors and attracticides), sterile insect release techniques, resistance management, cultural and mechanical practices, improved pesticide application technologies, and other related pest control tactics. Target pests include a multitude of insects, mites, and ticks; plant pathogens and nematodes; and weeds.

In addition, ARS funds the Areawide Pest Management Program, which supports 5 to 10 multi-year IPM projects to facilitate the implementation and adoption of ARS-developed IPM technologies to control or suppress agricultural pests over multi-state or multi-regional areas through partnerships with growers, commodity groups, and State institutions, Federal and State agencies, and the private sector. Past Areawide projects have supported the suppression of economically important pests such as codling moth in the Pacific Northwest, corn rootworm in the Midwest, leafy spurge in the Northern Plains, stored grain insects in the Midwest, tephritid fruit flies in the Hawaiian islands, fire ants in the Southern U.S., Russian wheat aphid and greenbug in the Great Plains, tarnished plant bug in Louisiana and Mississippi, and *Melaleuca* in the Florida everglades.

Current Areawide projects include:

- Methyl Bromide Alternatives for fruit and nut production in California and Florida (2007-2011);
- Weedy annual grasses on rangelands, such as cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*), in the Great Basin ecosystem of the United States (2008-2012);
- The Asian tiger mosquito (*Aedes albopictus*) and West Nile virus, with initial demonstration sites located in New Jersey (2008-2012);

- The navel orangeworm (*Amyelois transitella*) attacking almonds, pistachios, and walnuts in California (2008-2012); and
- Honey bee health, survival, and pollination availability across the United States by controlling bacterial, protozoan, fungal, and viral pathogens of honey bees, as well as Varroa and Acarapis bee mites (2008-2012).

Other related projects that contribute to the overall ARS IPM program include: a management program for the Formosan termite in Louisiana; a community-based field trial for control of the deer tick and Lyme disease in the northeastern United States; community based areawide pest management of silverleaf whitefly across the southern tier of the United States; and an IPM program that has significantly lowered glassy-winged sharpshooter/Pierce's disease in California vineyards.

NRCS is a true advocate for the use of integrated pest management, and encourages the use of methods that will successfully address the pest problem with the least negative impact upon the natural resources and the environment. Discussions by members of the State Technical Committee in each state sets priorities and methods of addressing natural resource issues, including invasive species. NRCS offices across the nation are also active members of a number of Cooperative Weed Management Areas that address invasive species from a regional perspective.

APHIS develops and applies biological control agents as part of an overall pest management program. There are areas infested with invasive plant pests that may not be treated with conventional pesticides or other cultural practices due to environmental sensitivity or public concern. Biological control may offer the only sustainable solution in these areas. For example, APHIS is partnering with ARS to evaluate natural enemies of the brown marmorated stink bug. Because of the broad host range of this pest, it is not possible to develop an integrated area-wide management program without incorporating biological control with other control methods. The natural enemies may become established in residential and natural areas while agricultural production areas may require the use of other



control tactics to maintain the pest below economically damaging levels.

**15. ISAC Recommendation:** To further enhance the potential effectiveness of biological control programs, ISAC recommends federal land management agencies that oversee and conduct control operations utilizing biological control agents become more fully engaged in adaptive management by collecting and sharing post-release monitoring data. This Integrated Pest Management (IPM) approach should emphasize partnerships with local controlling authorities, post-release monitoring and collaborative programs with land managers and other federal, state and university scientists in other pest management disciplines to develop principles and technical guidance and recommendations for invasive species management. As examples, such efforts have already been established by Team Leafy Spurge and the areawide melaleuca project.

*This recommendation addresses the National Invasive Species Management Plan, Implementation Task CM.4.1:*

*Enhance ecosystem recovery decision tools and conduct ecosystem assessments.*

NRCS includes, as a requirement in the conservation plans developed with private land-owners, monitoring the results of integrated pest management efforts in order to determine the performance of various IPM methods. Lessons learned from this monitoring assists NRCS in improving the technical assistance it provides to private landowners in addressing their specific invasive species issues.

USFS-National Forest System is developing new policy (Forest Service Manual and Forest Service Handbook) to provide standards, criteria, requirements and other guidance related to the management of invasive species using an integrated pest management approach. Proper record keeping on treatments and treatment efficacy will be part of the new Handbook, and will include guidance on using an adaptive resource management approach and promoting the sharing of treatment information with partners when applicable.



**16. ISAC Recommendation:** In accordance with the National Environmental Policy Act (NEPA), ISAC recommends that NISC Departments, Agencies and their contractors assess the risk of invasiveness whenever their activities lead to the introduction of [non-native] species or their subsets (i.e. moving organisms from where they occur to where they have never occurred historically).

ARS research projects follow the procedures described in the Code of Federal Regulations Title 7, Subtitle B, Chapter V, Part 520 for implementing the National Environmental Policy Act. These procedures assure that research and other activities of the Agricultural Research Service (ARS) comply with the intent of the National Environmental Policy Act of 1969 (NEPA) and appropriate regulations implementing this Act. These procedures incorporate and supplement, and are not a substitute for, CEQ regulations under 40 CFR parts 1500-1508, and Department of Agriculture NEPA Policies and Procedures under 7 CFR part 1b. ARS conducts and supports research as authorized by legislation to support one of the USDA goals of assuring adequate supplies of high quality food and fiber. Information generated through such research often forms the basic data needed to assess the impact of a new technology upon the environment. Large scale projects simulating commercial practices are normally implemented in cooperation with other agencies of the Federal or State Governments.

NRCS response: Climate change is requiring us to re-think our definition of, and preference for “native species.” Some plants considered to be “native” to specific locations may, due to climate changes, no longer be able to survive, or may become invasive. NRCS always assesses the risk of invasiveness when restoring areas, but, due to climate changes, we, and our partners in restoration, must now consider the viability and impacts of plants whether they are historically considered to be “native” or “invasive” to the specific location and climate.

USFS-National Forest System is developing new policy (Forest Service Manual and Forest Service Handbook) which will include requirements, standards, criteria, and other guidance on the use of standardized contract language and restrictions to prevent and

control invasive species on the National Forest System, including during activities conducted by permittees, contractors, and other cooperators.

I respectfully submit this report to ISAC. If you have any questions, do not hesitate to contact me. Thank you.

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